REMARKS

Claims 1, 2 and 6-17 were pending in the application. Claim 17 was withdrawn from consideration.

In the Final Office Action of May 1, 2003, claims 1, 2 and 6-16 were rejected.

In response, claims 1 and 16 have been amended. Claim 6 has been cancelled. Claims 18-29 have been added.

Claims 1, 2, and 6-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over WO 99/59214 in view of Fujimoto et al. (U.S. Patent No.: 5,683,834). Applicants respectfully traverse this rejection.

The present invention relates to a non-aqueous electrolyte secondary battery where the positive electrode contains a magnesium contained complex oxide mixed with a nickel contained complex oxide. In the prior art, the second battery using the mixture of lithium manganese complex oxide in lithium nickel complex oxide has a shortcoming that the characteristic deteriorates when preserved at a high temperature of, for example, 45°C to 60°C. Specifically, the battery, when used for information terminal for cellular phones or the like, requires capacity with heavy load and high termination voltage. However, a sufficient capacity is difficult to obtain after preservation at a high temperature. It is also difficult to obtain a sufficient charging/discharging cycle characteristic depending on the particle diameter of the lithium magnesium complex oxide and lithium nickel complex oxide. Thus, in order to satisfy the recent demand for high energy density, it is necessary to obtain a larger capacity.

It has been difficult to obtain an ideal mixing ratio for magnesium contained complex oxide to nickel contained complex oxide. When the content of the magnesium contained complex oxide is larger than the set value, the internal resistance of the secondary battery is

increased after being exposed at a high temperature. This will cause th magnesium contained complex oxide to deteriorate and the battery capacity to decrease. On the other hand, when the nickel contained complex oxide is larger than the set value, it causes low discharging potential after exposure at a high temperature.

Applicants have discovered that the battery capacity can be maintained even after exposure at a high temperature by forming an electrode containing the magnesium-contained complex oxide consisting lithium, magnesium, and the first element in a predetermined composition rate, and the nickel contained complex oxide containing lithium, nickel, and the second element in a predetermined composition rate. Also, a large discharging energy can be obtained when a high load discharging is performed under the condition of high potential cut off, for example, 3.3V after exposure at a high temperature. Therefore, when the battery is used for cellular phones, laptop computers or the like, an excellent battery characteristics can be maintained even if the battery is in the high temperature at about 40℃ to 60°Cby (for example, being left in a car).

Claim 1 has been amended to recite a non-aqueous electrolyte secondary battery comprising (a) a manganese-contained complex oxide containing: (i) lithium (Li); (ii) manganese (Mn); (iii) a first element (Ma) selected from the group consisting of zinc (Zn), aluminum (Al), tin (Sn), chromium (Cr), and magnesium (Mg) and *without cobalt (Co)*, wherein the chemical formula of the manganese-contained complex oxide is $Li_xMn_{2-y}Ma_yO_4$ and wherein x is the range of $0.9 \leq x\ 2.0 \leq$ and y is in the range of $0.01 \leq y\ 0.50 \leq$, both inclusive; and (b) a nickel-contained complex oxide containing: (i) lithium (Li); (ii) nickel (Ni); (iii) a second element selected from the group consisting of iron (Fe), cobalt (Co), zinc (Zn), aluminum (Al), tin (Sn), chromium (Cr), and magnesium (Mg), wherein the chemical formula of the nickel-contained complex oxide is $LiNi_{1-z}Ma_zO_2$ and wherein z is the range of $0.01 \leq z \leq 0.05$, both inclusive.

Claim 16 has been amended to recite a material for a positive electrode containing: (a) a manganese-contained complex oxide containing: (i) lithium (Li); (ii) manganese (Mn); (iii) a first element selected from the group consisting of cobalt (Co), zinc (Zn), aluminum (Al), tin (Sn), chromium (Cr), and magnesium (Mg), wherein the chemical formula of the manganese-contained complex oxide is $Li_xMn_{2-y}Ma_yO_4$ and wherein x is the range of $0.9 \leq x \leq 2.0$ and y is in the range of $0.01 \leq y \leq 0.50$, both inclusive; and (b) a nickel-contained complex oxide containing: (i) lithium (Li); (ii) nickel (Ni); (iii) a second element selected from the group consisting of iron (Fe), zinc (Zn), aluminum (Al), tin (Sn), chromium (Cr), and magnesium (Mg) and *without cobalt (Co)*, wherein the chemical formula of the nickel-contained complex oxide is $LiNi_{1-z}Ma_zO_2$ and wherein z is the range of ≤ 0.01 $z \leq 0.05$, both inclusive.

In contrast, WO 99/59214 ("WO'214") discloses a positive electrode comprised lithium cobalt manganese oxide of the composition $Li_2Co_yMn_{2-y}O_4$ where $0<y<0.6$ and $LiNi_xCo_{1-x}O_2$, where $0<x<1$; Fujimoto et al. (U.S. Patent No.: 5,683,834) discloses a spirally-wounded non-aqueous cell. However, none of the references discloses a mixed ratio of manganese-contained oxide without cobalt with a nickel-contained oxide with cobalt and vice versa.

Thus, it has been learned that an excellent preservation characteristic at a high temperature can be obtained by setting the mixing ratio of the nickel contained complex oxide to the magnesium contained complex oxide in terms of mass ratio, within the range of 90/10 and 10/90.

Thus, unlike Applicants' claims 1 and 16 the cited references fail to disclose or even suggest a positive electrode having a mixing ratio in the range of what was claimed for magnesium contained oxide to nickel contained oxide when one oxide is without cobalt.

Accordingly, Applicants submit that the claimed invention is neither anticipated by, nor obvious over, the applied references alone or in combination as suggested by the Examiner.

Claims 2, 7-15 and 18-29 all depend directly from claims 1 or 16 and are therefore allowable for at least the same reason that claims 1 and 16 are allowable.

In view of the foregoing, it is submitted that the pending claims 1, 2, 7-16 and 18-29 are patentable over the references cited by the Examiner. Further, all of the Examiner's objection and rejections have been addressed herein. It is, therefore, submitted that the application is in condition for allowance. Notice to that effect is respectfully requested.

Respectfully submitted,

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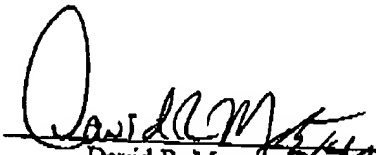

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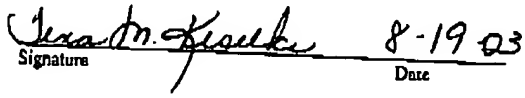

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